Smart-UPS® RT

Uninterruptible Power Supply
Stack/Rack-Mount 12U

SURT14000/18000 VA

200 Vac

SURT15000/20000 VA

208/240 Vac

English

990-3467A 02/2009

Introduction

Overview

The American Power Conversion (APC®) Smart-UPS® RT is a high performance uninterruptible power supply (UPS) that provides protection for electronic equipment (load) from utility power blackouts, brownouts, sags and surges. The UPS protects electronic equipment from small utility fluctuations and large disturbances by providing continuous on-line double converted power. The UPS provides battery backup until utility power returns to safe levels or the batteries are fully discharged.

Inventory

Read the Safety Guide before installing the UPS.

The UPS and the battery pack are shipped together in separate cartons.

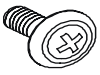
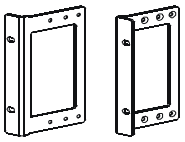
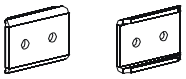
Inspect the UPS upon receipt. Notify the carrier and dealer if there is damage.

The packaging is recyclable; save it for reuse or dispose of it properly.

Check the UPS package contents:

- UPS
- Input wiring tray
- Output wiring tray
- Display interface
- Front bezel
- UPS serial cable
- Network Management Card (NMC) serial cable
- Jumper cable 25.4 cm (10 in)
- Rail Kit
- Four ornamental screws
- Two cage nuts
- Two rail cleats
- Four pan head screws
- Two rack-mount brackets
- Eight flat head screws
- Temperature sensor-refer to NMC documentation for installation instructions
- Literature kit containing:
  - Product documentation
  - Smart-UPS RT User Manuals CD
  - Network Management Card (NMC) Utility CD
  - Network Management Card (NMC) documentation
  - Safety information
  - Warranty information

NOTE: The model and serial numbers are located on a small, rear panel label. For some models, an additional label is located on the chassis under the front bezel.

Hardware		
4		Pan head screws for securing rail cleats to unit
8		Flat head screws for securing rack-mount or tie brackets to unit
4		Ornamental screws for securing unit to rack
2		Cage nuts used in rack-mount installation
2		Rack-mount brackets
2		Rail cleats

Accessories

Install accessories prior to connecting power to the UPS.

Refer to the APC Web site, **www.apc.com** for available accessories.

Specifications

Environmental Specifications

Temperature	**Operating**	0° to 40° C (32° to 104° F)	This unit is intended for indoor use only. Select a location sturdy enough to handle the weight. Do not operate unit where there is excessive dust or temperature or humidity are outside specified limits. **Ensure air vents on UPS are not blocked. Allow adequate space for proper ventilation.** Environmental factors impact battery life. High temperatures, poor utility power, and frequent, short duration discharges will shorten battery life.
	Storage	-15° to 30° C (5° to 86° F) charge UPS battery every six months 30° to 70° C (86° to 158° F) charge UPS battery every three months	
Maximum Elevation	**Operating**	3,000 m (10,000 ft)	
	Storage	15,000 m (50,000 ft)	
Humidity		0 to 95% relative humidity, non-condensing	

Physical Specifications

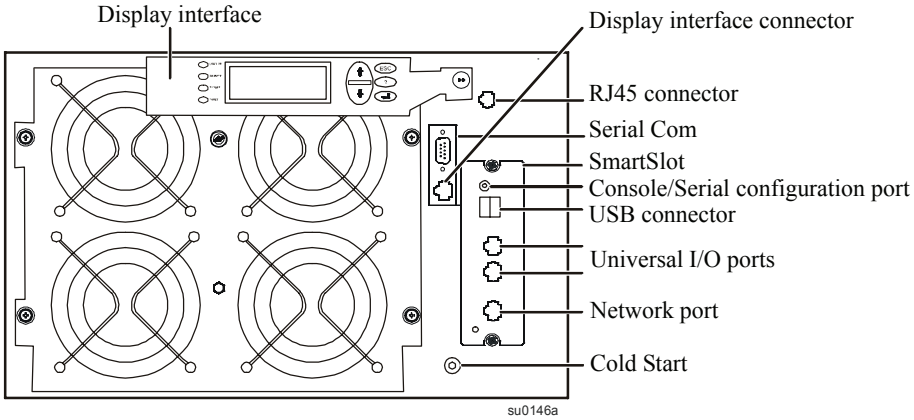
Weight **Refer to Safety Guide supplied with this unit for lifting guidelines.**		
UPS		66 kg (145 lbs)
Battery Pack	with eight battery modules	181 kg (400 lbs)
	without battery modules	44 kg (96 lbs)
	each battery module	17 kg (38 lbs)
Maximum number of external battery packs (XLBPs) supported by Smart-UPS RT		10 **Combined weights of UPS, battery pack and all XLBPs installed in a rack must not exceed rack weight limits.**

Physical Specifications continued

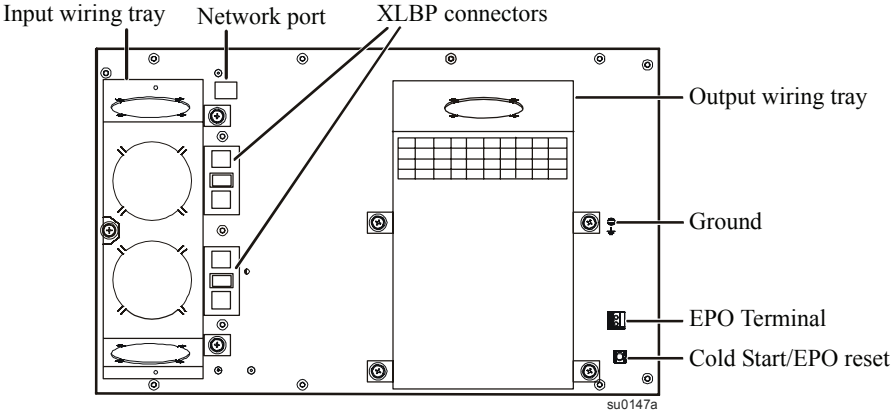
Dimensions		
UPS	**width**	482 mm (19 in) with rack-mount brackets 432 mm (17 in) without rack-mount brackets
	height	263 mm (10.4 in)
	depth	773 mm (30.4 in)
Battery Pack	**width**	482 mm (19 in) with rack-mount brackets 432 mm (17 in) without rack-mount brackets
	height	263 mm (10.4 in)
	depth	739 mm (29.1 in) with PDU 720 mm (27.3 in) without PDU

Front and rear UPS panels

Front Panel



Rear Panel



Stack and rack-mount installation

Batteries must be removed from battery pack and XLBP(s) prior to installing units in stack or rack-mount configurations. Refer to the instructions on packaging for details on removing batteries.

Always place the UPS above the battery pack and XLBPs.

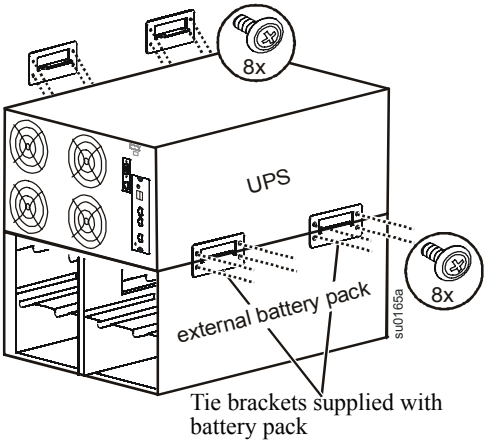
Stack configuration

The UPS and battery pack must be connected with ground wires. Refer to the XLBP user manual for details.

Total stack configuration height must NOT exceed 18U. The UPS and battery pack together equal 12U. Adding one XLBP creates an 18U configuration.

For detailed instructions on installing batteries, and battery doors, refer to “Rack-mount configuration” on page 6 in this manual.

Refer to “Route network cable” on page 9 in this manual for cable routing details.



Install tie brackets

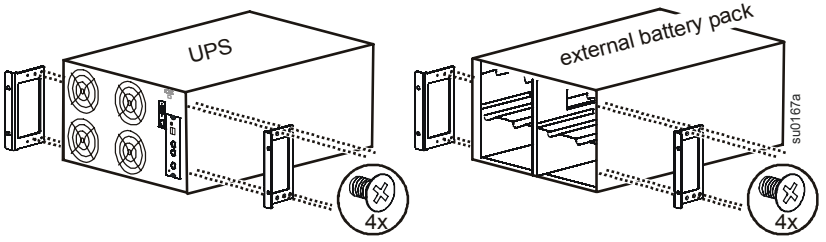
Four ornamental screws (supplied in battery pack package), must be used to secure each tie bracket to the units.

Rack-mount configuration

Read the Safety Guide included in the package and refer to “Physical Specifications” on page 4 in this manual before installing the UPS.

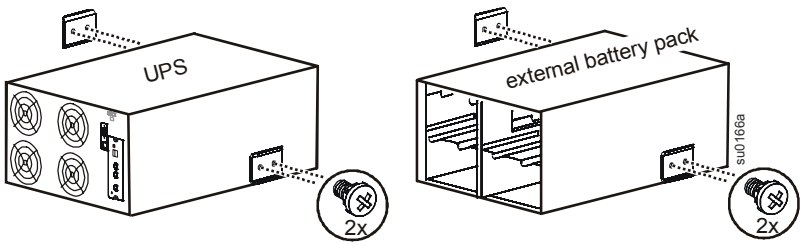
Install rack-mount brackets

Four flat head screws must be used to secure each rack-mount bracket to the unit.



Install rail cleats

Two pan head screws must be used to secure each rail cleat to the unit.



Install rails in rack

For details on rail installation refer to instructions included in rail kit package.

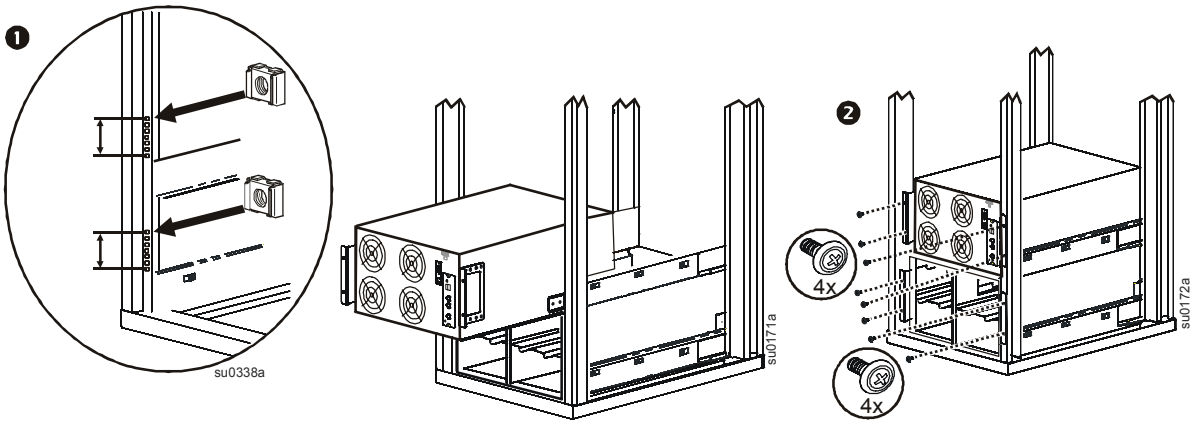
Install units in rack

Secure UPS and battery pack in rack using cage nuts and ornamental screws included in package.

Four ornamental screws and two cage nuts must be used to secure each unit.

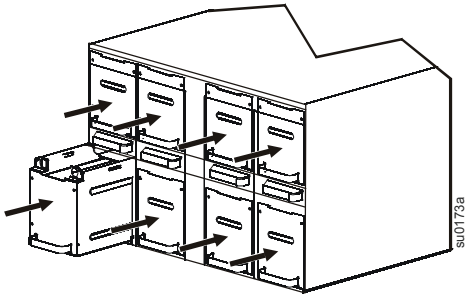
A cage nut must be used in the top hole of each rack-mount bracket when securing the unit in the rack.

The bottom hole of each rack-mount bracket can be secured using an ornamental screw in the threaded hole.

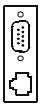
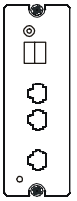


Install battery modules

For UPS operation, all eight battery modules must be installed.



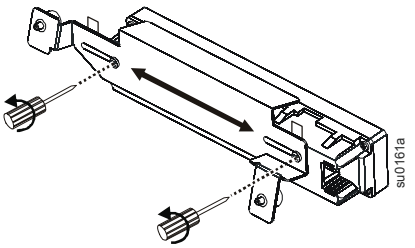
Communication ports

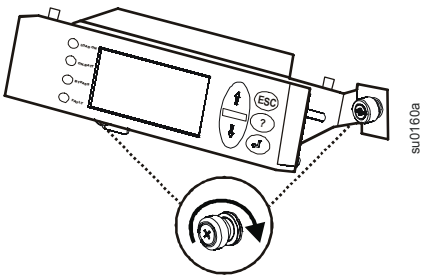
	**Serial Com port and Display Interface connector**	Use only the supplied cable to connect to the serial port. A standard serial interface cable is incompatible with the UPS.
	**Communication ports on the Network Management Card Refer to "Front and rear UPS panels" on page 5 for port identification.**	Refer to the NMC user manual for local configuration instructions.

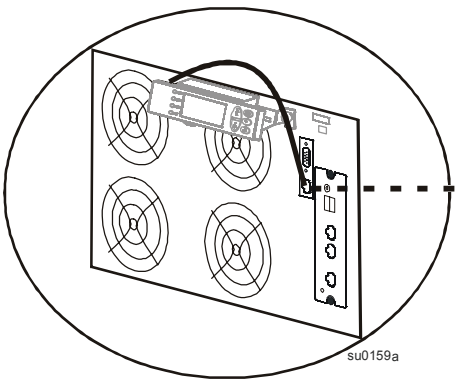
Display interface installation

Prior to attaching the display interface to the UPS:

1. Loosen two bracket screws on rear of display interface.
   a. Slide bracket to the position that will accommodate screw holes on the UPS.
   b. Tighten screws on bracket.
2. Insert display interface tabs into slots on UPS.
3. Secure display interface to UPS using two thumb screws attached to display interface.







Connect display interface cable to RJ45 connector labeled **Display**, located on the front of the UPS.

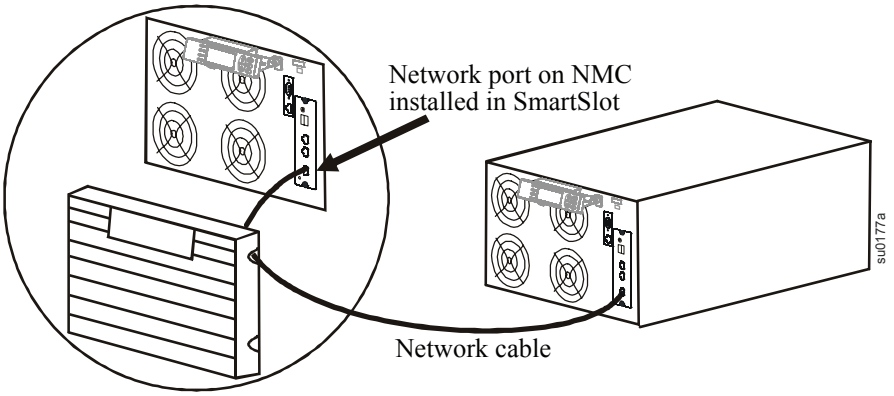
Route network cable

Network cable wiring front panel access

The NMC is installed in the SmartSlot located on the front of the UPS.

Connect a network cable (not supplied), to the network port on the NMC.

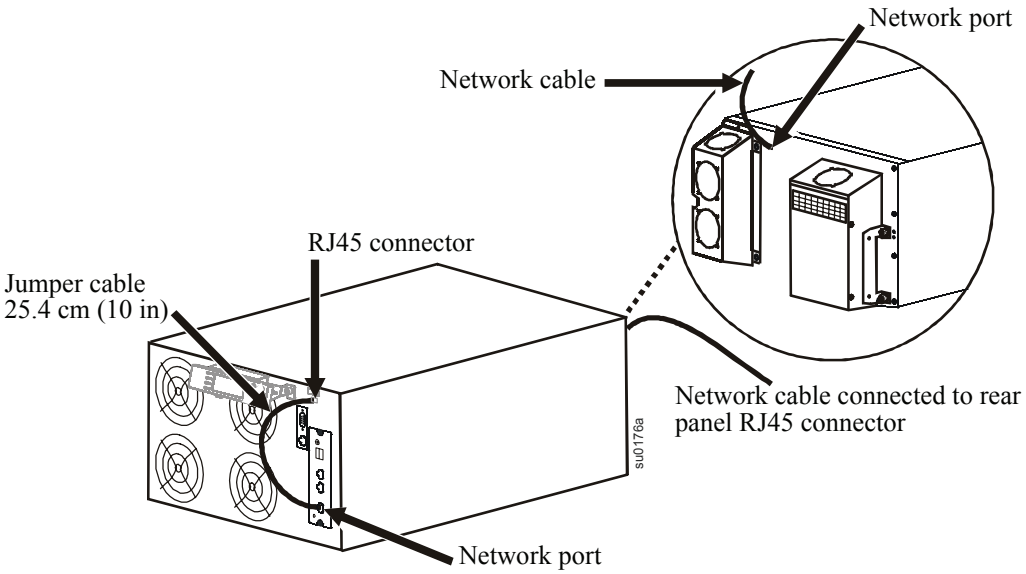
Cables connected to the UPS for front panel access must be routed through one of the notches on bezel.



Network cable wiring rear panel access

Network connection can be accessed from the RJ45 connector located on the rear panel of the UPS.

1. Locate the RJ45 connector on the front panel of the UPS. Connect the jumper cable (supplied), to the NMC RJ45 connector labeled NETWORK.
2. Connect a network cable (not supplied), from a network device to the RJ45 connector on the rear panel of the UPS.



Emergency Power Off (EPO)

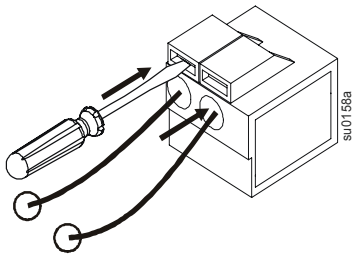
The system power can be disabled in an emergency by closing a switch connected to the EPO.

Wiring must be performed by a qualified electrician. Adhere to all local and national electrical codes.

The switch should be connected in a normally open switch contact. External voltage is not required; the switch is driven by 24 V internal supply. In closed condition, 4 mA of current are drawn.

The EPO switch is internally powered by the UPS for use with non-powered switch circuit breakers.

The EPO circuit is considered a Class 2 circuit, (UL, CSA standards) and an SELV circuit (IEC standard).

EPO terminal	located on rear panel	
EPO connector	• Strip insulation from one end of each wire to be used for connecting EPO. • Insert screwdriver into the slot above terminal to be wired. Insert stripped wire into terminal. Remove screwdriver to secure wire in terminal. Repeat for each terminal.	

Both Class 2 and SELV circuits must be isolated from all primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2 or SELV. If circuit standard cannot be confirmed, use a contact closure switch.

Use one of the following cable types to connect the UPS to the EPO switch.

- CL2: Class 2 cable for general use.
- CL2P: Plenum cable for use in ducts, plenums, and other spaces used for environmental air.
- CL2R: Riser cable for use in a vertical run in a floor-to-floor shaft.
- CLEX: Limited use cable for use in dwellings and for use in raceways.
- For installation in Canada: Use only CSA certified, type ELC, (extra-low voltage control cable).
- For installation in other countries: Use standard low-voltage cable in accordance with national and local regulations.

Wiring Specifications

Input Connections	Output Connections
Utility Input Wire to L1, N/L2, ground	**Hardwire** Wire to L1, N/L2, ground
	PDU XL battery pack PDU to UPS: Wire L1, N/L2, ground

System	Wiring	Voltage	Current Full Load (maximum)	External Input Circuit Breaker (typical)	Wire Size (typical)*
SURT14K	Input	200 Vac	80 A	100 A / 2-pole	25 mm^2 (2 AWG)
	Output	200 Vac	70 A	not required	25 mm^2 (2 AWG)
SURT15K	Input	208/240 Vac	80 A	100 A / 2-pole	25 mm^2 (2 AWG)
	Output	208/240 Vac	72 A	not required	25 mm^2 (2 AWG)
SURT18K	Input	200 Vac	100 A	125 A / 2-pole	35 mm^2 (1 AWG)
	Output	200 Vac	90 A	not required	35 mm^2 (1 AWG)
SURT20K	Input	208/240 Vac	100 A	125 A / 2-pole	35 mm^2 (1 AWG)
	Output	208/240 Vac	96 A	not required	35 mm^2 (1 AWG)

Wire gauges may vary. Adhere to national and local electrical codes when wiring this unit.

* Terminal screw tightening torque: 40 lb-in (4.5 N-m)

Acceptable input frequency range is 40 to 70 Hz.

Output voltage and frequency are user selectable only when UPS is in **Load Disconnect** mode.

Refer to display interface menu screens for available options.

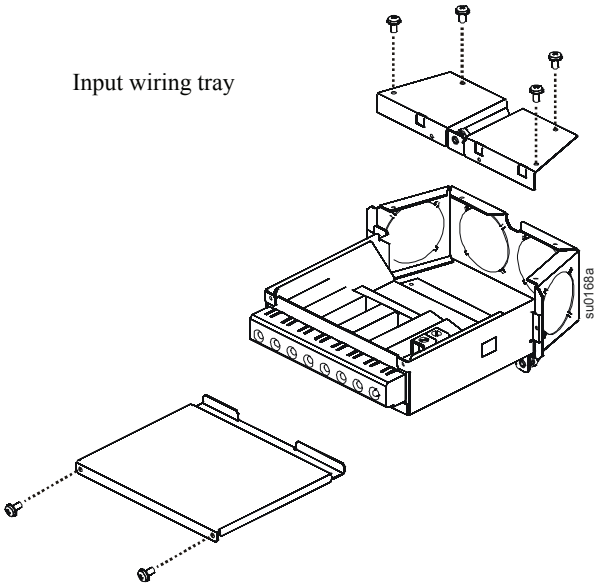
Input wiring

Wiring must be performed by a qualified electrician.

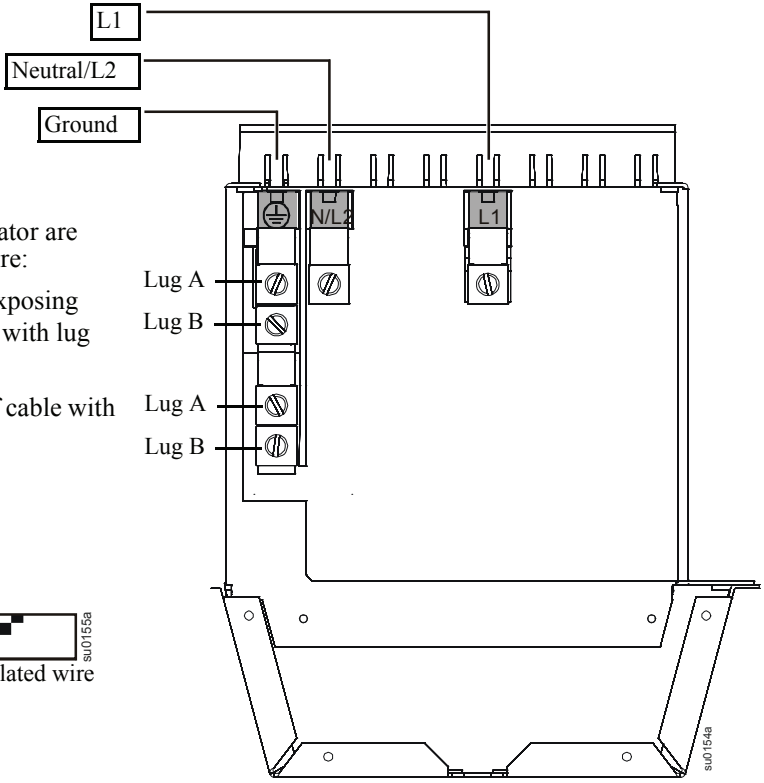
Adhere to all national and local electrical codes.

1. Install a utility circuit breaker in accordance with local electrical codes.
2. Switch utility circuit breaker OFF.
3. Remove the screws that secure the covers and take the covers off the tray.
4. Remove appropriate circular knockouts from input wiring tray.
5. Install appropriate strain-relief (not supplied), on hardwired input power cables.
6. **Connect ground terminal first**. Then connect the remaining wires. Route wires through knockout holes to terminal blocks. Refer to "Wiring Specifications" on page 11 and "Input hardwiring" on page 13.
7. Secure wiring tray cover using screws removed in *step 3* above.

Failure to follow these instructions may result in personal injury or equipment damage.

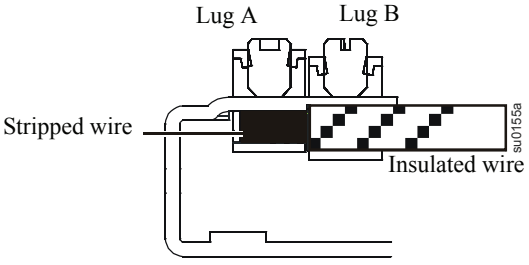


Input hardwiring



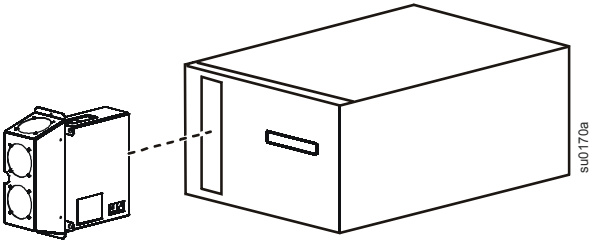
Ensure ground wire conductor and insulator are securely fastened. To connect ground wire:

1. Strip cable of insulation, exposing wire. Secure exposed wire with lug "A".
2. Secure insulated portion of cable with lug "B".



Install input wiring tray in UPS

Secure input wiring tray to UPS using three screws attached to the tray.



Output wiring

Wiring must be performed by a qualified electrician.

Adhere to all national and local electrical codes.

Failure to follow these instructions may result in personal injury or equipment damage.

Connect load to UPS

There are two ways to connect the load to the UPS.

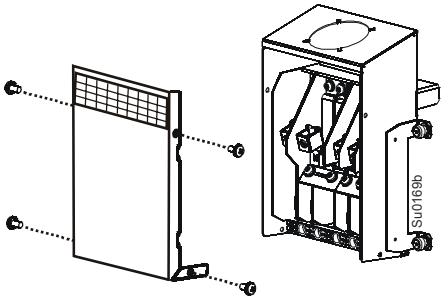
- Hardwire the load through the output wiring tray.
- Connect the load using the six output receptacles on the external battery pack.

Remove output wiring tray cover

Remove the screws that secure the cover and take the cover off the tray.

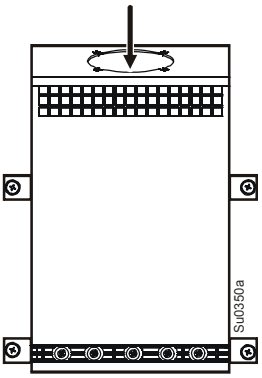
If hardwiring the load continue to the section below, **Hardwire the load**.

If connecting the load using the six output receptacles on the external battery pack, skip to “Install output wiring tray in UPS” on page 15.

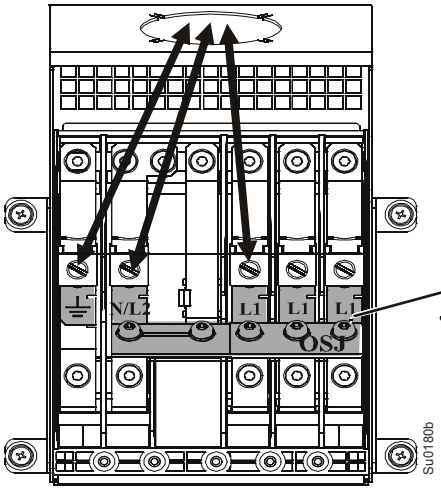


Hardwire the load

1. Remove appropriate circular knockout from output wiring tray.
2. Install appropriate strain relief (not supplied), for hardwire cables.



3. **Connect ground terminal first**. Then connect the remaining wires. Route wires through the knockout hole to the terminal blocks. See diagram below. Refer to "Wiring Specifications" on page 11.

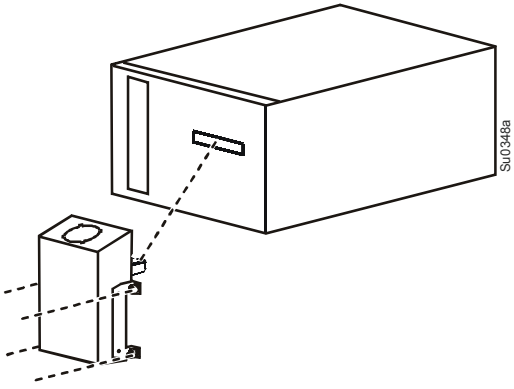


Ensure OSJ is secured to output wiring tray using five screws supplied.

Install output wiring tray in UPS

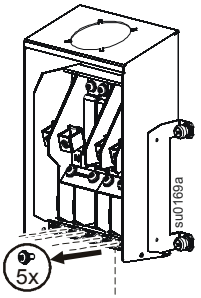
Insert the wiring tray into the appropriate slot on the UPS rear panel.

Tighten the screws to secure the tray to the UPS.



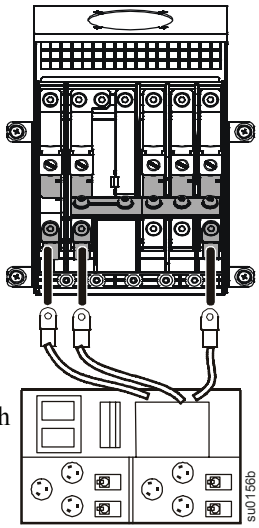
Connect PDU to output wiring tray

1. Remove the five screws securing the strain relief bar on the output wiring tray.



Strain relief bar

Output wiring tray



External battery pack with PDU and six output receptacles

2. Connect the PDU on the external battery pack to the output wiring tray.
3. Replace the strain relief bar using the five screws removed in *step 1*.
4. Replace the covers using the screws removed preciously.

Connect the load using external battery pack connectors

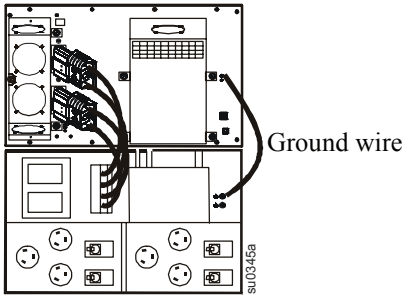
The PDU must be connected to the output wiring tray. Refer to “Connect PDU to output wiring tray” on page 16.

Connect the load to the UPS using the six output receptacles on the external battery pack. Connect the external battery pack to the UPS.

Connect the ground wire between the UPS and the external battery pack.

Connect the external battery pack to the UPS by plugging the external battery pack connectors into the UPS rear panel connectors.

Refer to the external battery pack user manual for details on removing and securing the battery connector safety covers.



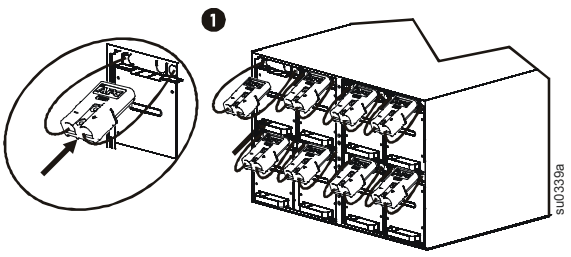
Six output connectors

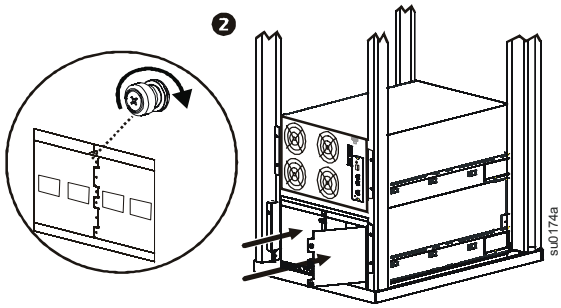
Connect battery modules

Connect all eight battery modules. Failure to do so may cause equipment damage.

Replace battery compartment doors.

Tighten the screws to secure battery compartment doors.

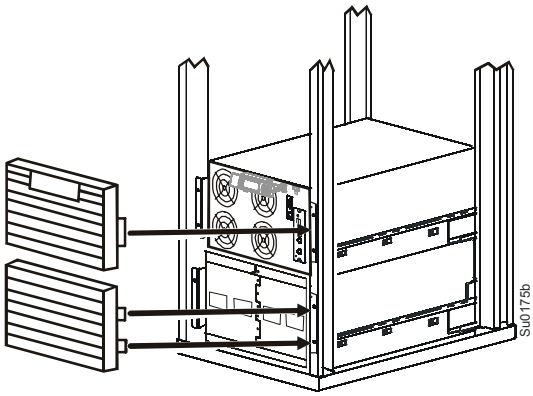




Install bezels

There is a single latch on either side of the UPS bezel.

There are two latches on either side of the battery pack and XLBP bezels.



Connect load to UPS

Connect equipment to the UPS. Refer to “Output wiring” on page 14.

Each connected load must be switched OFF.

The battery charges to 90% capacity during the first three hours of normal operation. *Do not* expect full battery run capability during this initial charge period.

Refer to the APC Web site, www.apc.com for battery runtimes.

Where appropriate use an APC extension battery cable. For ordering details contact a dealer or APC through the Web site www.apc.com.

Connect power to UPS and load

1. Connect input power to UPS.
2. Check the display interface LCD for messages.
3. Turn on the load using the interface display menu option, **Turn Load On** accessed through the **Control** menu screen. Refer to “Menu Tree” on page 20 and “Menu screens map” on page 23.

Operation

Normal operation

During normal operation, the UPS double converts utility power to conditioned power for the connected load.

Battery operation

During battery operation, the UPS provides power to the connected load from batteries for a finite period of time. The UPS transfers to battery operation if the supply of utility power fails or is outside predefined limits.

Bypass operation

Bypass mode is reached either as a user selection or automatically.

- Bypass mode can be selected through the **Control** menu screen on the display interface.
- The UPS will automatically switch into bypass mode if:
  - Both normal and battery operation modes are unavailable
  - An output overload condition occurs
  - The UPS has an internal fault

During bypass operation the utility power is connected to the load, bypassing the internal converters.

If bypass mode becomes unavailable the UPS will automatically switch to utility power. In the event that utility power is unavailable the system will switch to battery power.

System OFF

The **System OFF** feature can be accessed through the **Control** menu screen on the display interface.

The **System OFF** feature will shutdown the UPS system immediately when the following two conditions occur and the **System OFF** feature has been activated.

- The UPS is receiving no input utility power.
- The connected load is receiving no input power.

If the above two conditions occur and the **System OFF** feature has not been activated, a countdown of 15 minutes will be displayed on the LCD **Overview Status** screen. When the 15 minute countdown is complete the UPS system will shutdown automatically.

The UPS and the connected load will return to previous operation status when reconnected to utility power within the 15 minute countdown.

Battery LED

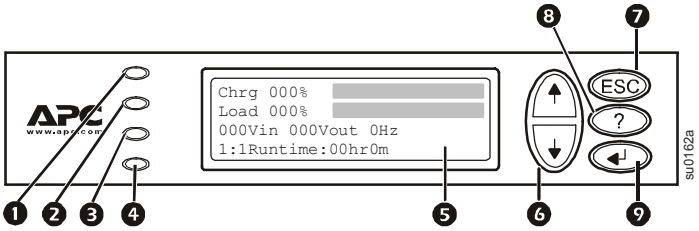
The battery LED is located on the front bezel of the XLBP. During normal operation the LED is not illuminated.

On start-up the XLBP LED may illuminate and blink within the first minute. The LED should then extinguish.

Refer to the XLBP User Manual for details on XLBP operation.

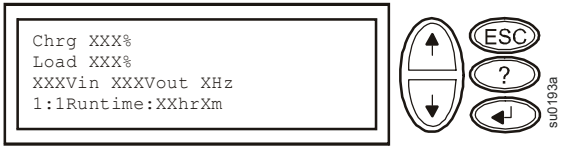
Display interface

The four LEDs to the left of the LCD indicate the operational status of the UPS. The five navigation keys to the right of the LCD are used to select and open menu items, access information, change system parameters, and access context sensitive help.



❶	LOAD ON	When LED illuminates green, the UPS supplies power to the load
❷	ON BATT	When LED illuminates yellow, power to load flows from the batteries to the power module
❸	BYPASS	When LED illuminates yellow, power to the load is supplied through bypass
❹	FAULT	When LED illuminates red, a fault condition exists
❺	LCD Screen	Displays menu screens for alarms, status data, instructional help, and configuration items
❻	UP and DOWN navigation keys	Used to scroll through and select menu items
❼	ESC key	Returns to previous screen displayed
❽	HELP key	Opens context-sensitive help
❾	ENTER key	Opens menu items and saves changes to system parameters

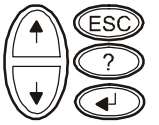
To access **overview status** screen on LCD press ESC key.



To access **main menu** screen from overview status screen, press ENTER key ↵.

Navigating menu screens

Use ESC key to navigate between menu screens.
Use UP/DOWN arrow keys to scroll through list of sub menus and commands on any screen.



Use ENTER key to navigate to a sub menu and to select user configurable commands.

An arrow indicates that there are sub menus containing user selectable commands.

Navigating sub menu screens

Use UP/DOWN arrow keys to scroll through the list of functions and commands on a sub menu screen.

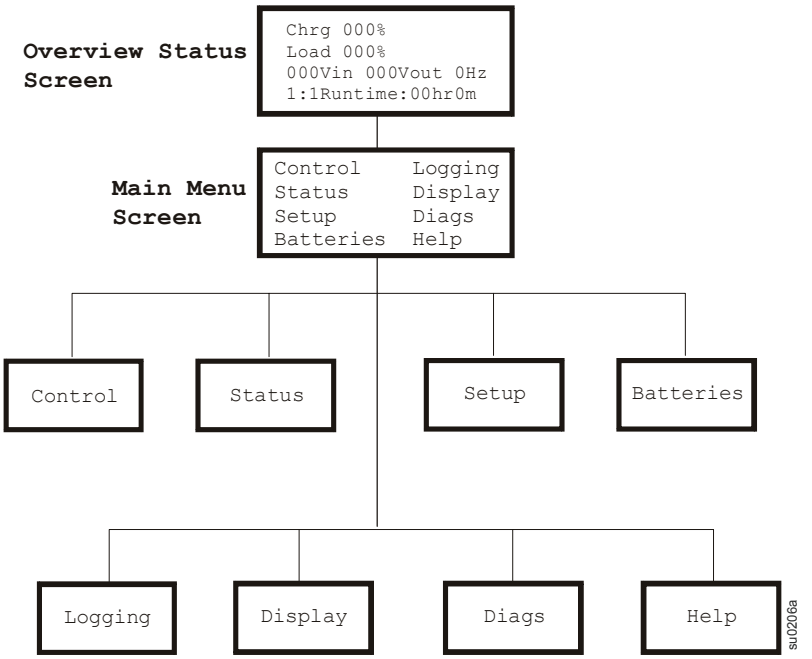
↓ after last entry on a sub menu, indicates a continuation of function/command list.

Use UP/DOWN arrow keys to view remaining entries in list.

Use ENTER key to select a command and move to sub menus associated with that function/command.

Menu Tree

The menu tree provides an overview of the top level menu screens.



Configuration

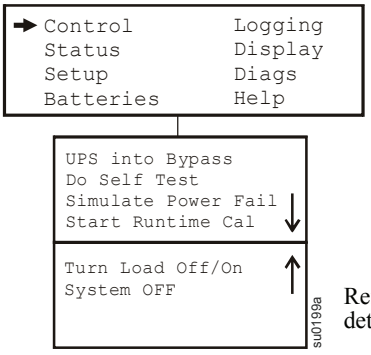
UPS configuration options can be adjusted through the display interface or NMC

Configurables	Factory Default	User Selectable Choices	Description
Setup/Settings/Shutdown			
Low Batt Dur	2 min	2, 5, 7, 10, 15, 18, 20 min	The low battery warning beeps become continuous when two minutes of runtime remains. Change the warning interval to a higher setting if the operating system requires a longer interval for shutdown.
Shutdown Dly	20 sec	20, 180, 300, 600 sec	Set the interval between the time when the UPS receives a shutdown command and the actual shutdown.
Turn On Dly	0 sec	0, 60, 180, 300 sec	Specify the time the UPS will wait after the return of utility power before turn-on (to avoid branch circuit overloads).
Return Bat Cap	0%	0%, 15%, 25%, 35%, 50%, 60%, 75%, 90%	Specify the percentage to which batteries will be charged following a low-battery shutdown before powering connected equipment.
Setup/Settings/Default			
Default	Set all UPS settings to factory defaults		
Setup/Settings/System			
System/Voltage	Output 200 V Output 208 V	200 V 208 V, 240 V	Allows user to select UPS output voltage. This feature is available ONLY when the load is OFF. **Use voltage setting applicable to region.**
System/ Frequency	Auto	50 Hz, 60 Hz	Sets allowable UPS output frequency. Whenever possible, output frequency tracks input frequency. This feature is available ONLY when the load is OFF.
System/ Frequency/ Range	50±3 Hz, 60±3 Hz	50±3 Hz, 50±0.1 Hz 60±3 Hz, 60±0.1 Hz	
System/Slew Rate	1 Hz/sec	1, .5, .25 Hz/sec	Slew rate limits the rate of change of output frequency. Whenever possible, output frequency tracks input frequency.
System/Cyclic Chrg	OFF	OFF, ON	The cyclic charge feature shuts off battery charge power periodically while the UPS is running on utility power, and the batteries are fully charged. The cycles are 10 hours on and 48 hours off. This extends battery life.
System/ Auto Start	ON	ON, OFF	After a low battery shutdown, the UPS will automatically start if utility power is available.

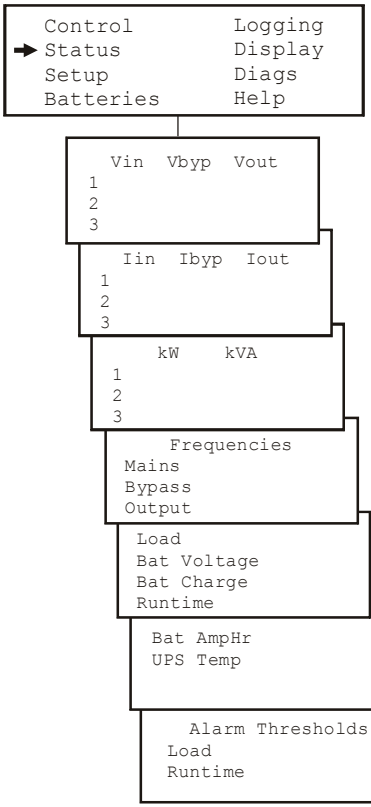
Configurables	Factory Default	User Selectable Choices	Description
Setup/Settings/Alarms			
Alarm Thresholds/Load			
14 kVA	14 kVA	2, 4, 6, 8, 10, 12, 14 kVA, Never	If the connected load exceeds the load alarm threshold an alarm is activated.
15 kVA	15 kVA	5, 10, 15 kVA, Never	
18 kVA	18 kVA	2, 4, 6, 8, 10, 12, 14, 16, 18 kVA, Never	
20 kVA	20 kVA	5, 10, 15, 20 kVA, Never	
Alarm Thresholds/Runtime			
All models	0	0, 5, 10, 15, 30, 45 min; 1-8 hrs	When remaining battery runtime is at or below the selected runtime threshold, an alarm is activated.
Setup/Settings/Clock			
Date			The date and time functions are used to time-stamp events in the event log. To avoid inaccuracies, change the time setting to reflect day light saving time where applicable.
Time			
Setup/Settings/Other			
Self Test	14 days	7, 14 days, At Pwr On, OFF	Set interval at which UPS will execute a self-test.
User ID			Uniquely identify UPS, (i.e. server name or location) for network management purposes.
Ext Bat Cap	0 Ah	0-200 Ah	Press the ENTER key. Use the UP/DOWN arrow keys to select desired value. Press the ENTER key to move to next digit. Press the ENTER key after selecting final value, to lock in battery capacity setting.
Display			
Display Setup			
Language			Select language desired for viewing menu screens.
Contrast	0	0-7	Adjusts contrast between LCD text and back lighting.
Beeper Setup			
Beep at	PwrFail +30	PwrFail +30, PwrFail, Low Bat, Never	An alarm can be set to warn of an imminent power failure, a power failure that will occur in 30 seconds, or when a low battery condition occurs.
Volume	Low	Off, Low, Medium, High	Sets beeper volume.
Key Click	Off	Off, On	Sets key click volume to On or Off.

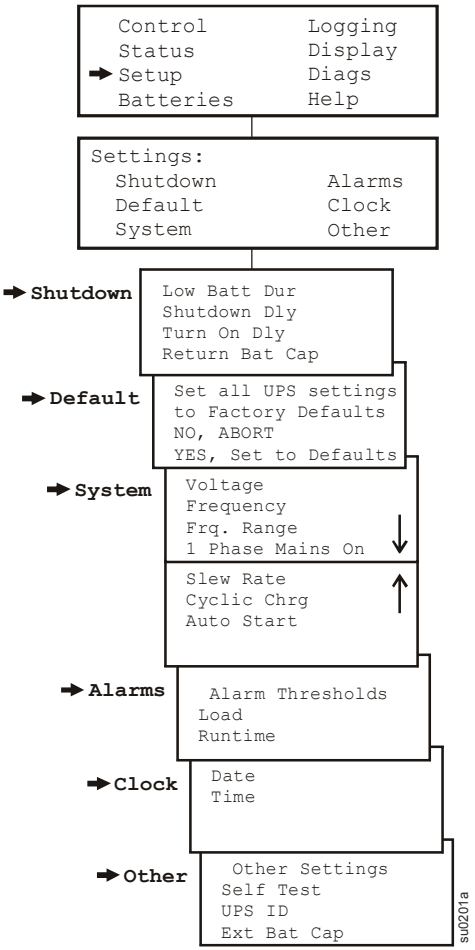
Menu screens map

Refer to the *Configuration* table on the previous pages for specific system configuration settings.



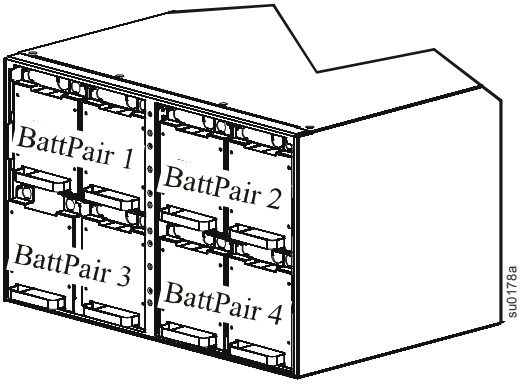
Refer to *Operation* in this manual for details on **System OFF** functionality.

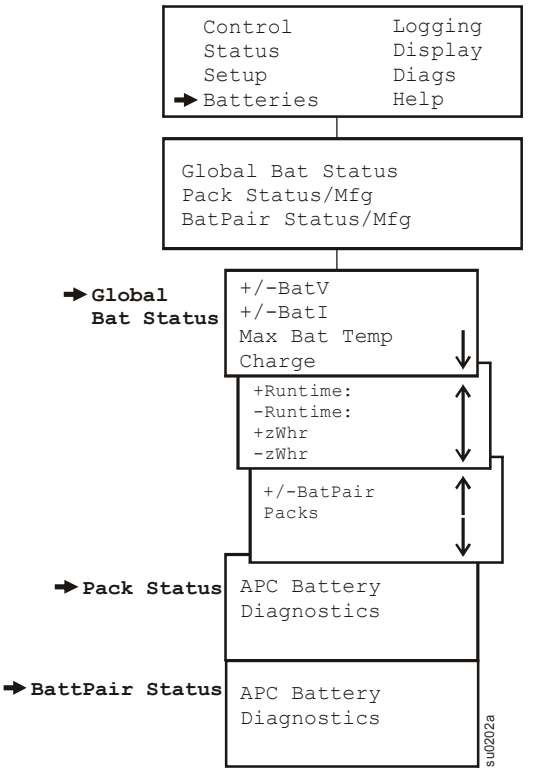




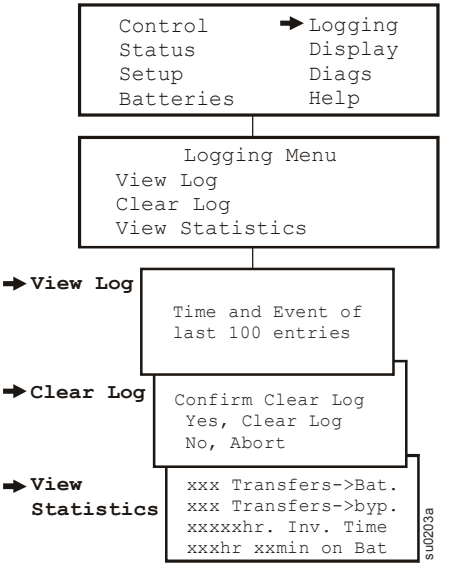
The display interface will reference XLBP configuration in the following manner.

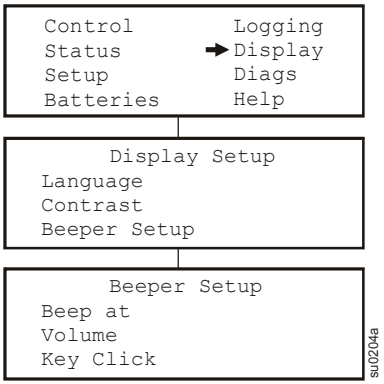
External Battery Pack			
Negative BattPair 1		**Positive BattPair 2**	
Module 1	Module 2	Module 3	Module 4
Negative BattPair 3		**Positive BattPair 4**	
Module 5	Module 6	Module 7	Module 8

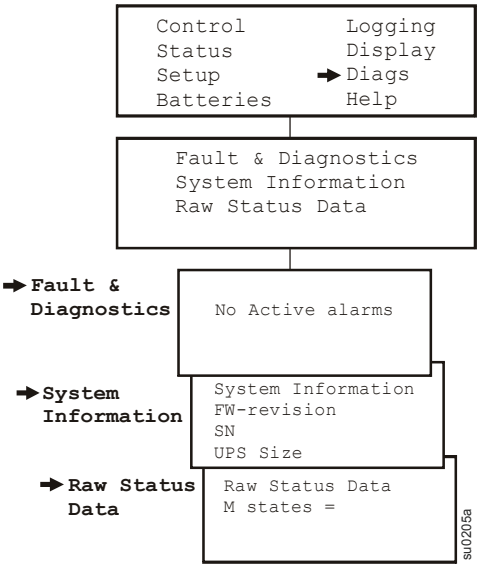




Pack Status and **BattPair Status** are for battery diagnostic purposes and are intended for use by APC service personnel.




Control
Status
Setup
Batteries
Logging
Display
Diags
Help
Display Setup
Language
Contrast
Beeper Setup
Beeper Setup
Beep at
Volume
Key Click
su0204a


Control
Status
Setup
Batteries
Logging
Display
Diags
Help
Fault & Diagnostics
System Information
Raw Status Data
Fault & Diagnostics
No Active alarms
System Information
System Information
FW-revision
SN
UPS Size
Raw Status Data
Raw Status Data
M states =
su0205a

Troubleshooting display messages

Use the table below to solve minor installation and operation problems. Refer to the APC Web site, www.apc.com for assistance with complex UPS problems.

The display interface reports various messages on the LCD, including alarm status and changes in system configuration. This section lists all display interface messages, the reason for the message, and the appropriate corrective action.

Messages may occur simultaneously. If this happens, be sure to review all of the messages for a better understanding of the system condition.

Condition	LCD Message	Reason for Message	Corrective Action
Start-Up	#Batteries changed since last ON.	At least one battery module has been added or removed from the UPS since the last time the Pwr ON command was issued.	No corrective action necessary. Proceed with the start-up.
	Automatic Self Test Started.	The UPS has started pre-programmed battery test.	
	Batt capacity less than Return Batt Cap.	The battery capacity of the UPS is less than the user-specified minimum battery capacity required to turn on the load.	Option 1) Abort the start-up and allow batteries to recharge. Option 2) Continue start-up, with less than minimum battery capacity.
	System Start-Up Configuration Failed.	System configuration error: Start-up diagnostic fault.	Check for other alarms. Ensure input and output wiring configurations are correct. Refer to "Input wiring" on page 12 and "Output wiring" on page 14 in this manual. If the problem persists contact APC Customer Support. Refer to "Contact Information" on page 31 in this manual.
	Mains: Site Wiring Fault.	• Input and/or output wiring trays are not configured correctly. • Output jumper is not installed/	Verify input and output wiring. Verify output jumper installation. Refer to "Input wiring" on page 12 and "Output wiring" on page 14 in this manual.
General Status	# of batteries increased.	At least one battery pair has been added to the system.	No corrective action is necessary.
	# of batteries decreased.	At least one battery pair has been removed from the system.	
	# External Battery Packs increased.	At least one external battery pack has been connected to the UPS.	
	# External Battery Packs decreased.	At least one external battery pack has been disconnected from the UPS.	
Module Failure	Bad Battery Pair.	A battery pair has failed and requires replacement.	Refer to battery pair installation in the external battery pack user manual.

Condition	LCD Message	Reason for Message	Corrective Action
Threshold Alarm	Load Power Is Above Alarm Limit.	The load has exceeded the user-specified load alarm threshold.	Option 1) Use the display interface to raise the alarm threshold. Option 2) Reduce the load
	Load Is No Longer Above Alarm Threshold.	The load exceeded the alarm threshold. The situation has been corrected. Either because the load decreased or the threshold was increased.	No corrective action is necessary.
	Min Runtime Restored.	The system runtime dropped below the configured minimum and has been restored: 1) Additional battery modules were installed. 2) The existing battery modules were recharged. 3) The load was reduced. 4) The user- specified threshold was decreased.	
General Fault	Need Bat Replacement.	One or more battery pairs are in need of replacement.	Refer to battery installation procedure.
	No Batteries Are Connected.	No battery power is available.	Check that batteries are installed and connected properly.
	Discharged Battery.	The UPS is on battery operation and the battery charge is low.	Shut down the system and the load or restore the incoming voltage.
	Low- Battery.	The UPS is on battery operation and the battery charge is low.	
	Weak Batt(s) Detected. Reduced Runtime.	One or more weak battery pairs detected (only applicable for internal battery modules).	Replace the weak battery pairs.
	Batt Temperature Exceeded Upper Limit.	The temperature of one or more battery packs has exceeded system specifications.	Contact APC Customer Support. Refer to “Contact Information” on page 32 in this manual.
	Battery Over-Voltage Warning.	The battery voltage is too high and the charger has been deactivated.	
	Runtime Is Below Alarm Threshold.	The predicted runtime is lower than the user-specified minimum runtime alarm threshold. Either the battery capacity has decreased, or the load has increased.	Option 1) Allow the batteries to recharge. Option 2) If possible, increase the number of battery modules. Option 3) Reduce the load. Option 4) Decrease the alarm threshold.

Condition	LCD Message	Reason for Message	Corrective Action
General Fault	Shutdown Due To Low Battery.	The UPS shutdown while on battery operation.	No corrective action is necessary. Note: Should this situation reoccur, consider increasing battery capacity.
	Bypass Not Available. Input Freq/Volt out Of Range.	The frequency or voltage is out of acceptable range for bypass. This message occurs when the UPS is online.	• Correct input voltage to acceptable frequency or voltage. • Adjust bypass upper and lower voltage limits through NMC software. If the problem persists contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	Mains Not Available. Input Freq/Volt Out of Range.	The frequency or voltage is out of acceptable range for normal operation.	Correct input voltage to acceptable frequency or voltage. If the problem persists contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	Emergency PSU Fault.	Redundant Emergency Power Supply Unit (PSU) is not working. Internal diagnostic fault.	Contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	Fan Fault.	A fan has failed.	Contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	Static Bypass Switch Fault.	The static bypass switch has failed.	
	System Failure Detected by Surveillance.	The system has detected an internal error.	Check for other alarms. If the problem persists contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	System Not Synchronized to Bypass.	System cannot synchronize to bypass mode.Bypass mode may be unavailable.	Option 1) Decrease input frequency sensitivity. Contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual. Option 2) Correct bypass input voltage to provide acceptable frequency or voltage.
	UPS In Bypass Due To Fault.	The UPS has transferred to bypass mode due to a fault.	Contact APC Customer Support. Refer to "Contact Information" on page 32 in this manual.
	UPS In Bypass Due To Overload.	The load has exceeded the power capacity.	Decrease the load.
	UPS Is Overloaded.	The load has exceeded the system power capacity.	Decrease the load.

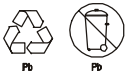
Maintenance and service

Replace battery modules

This UPS has easy-to-replace, hot-swappable battery modules. Replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and connected equipment on during the replacement procedure.

Once the batteries are disconnected the connected equipment is not protected from power outages.

Refer to the appropriate replacement battery user manual for battery module installation instructions. See your dealer or contact APC at **www.apc.com** for information on replacement battery modules.



Be sure to deliver the spent battery(s) to a recycling facility or ship it to APC in the replacement battery packing material.

Service

If the unit requires service do not return it to the dealer. Follow these steps:

1. Review problems discussed in “Troubleshooting display messages” on page 26 to eliminate common problems.
2. If the problem persists, contact APC Customer Support through the APC Web site, **www.apc.com**.
   - Note the model number of the unit, the serial number located on the back of the unit, and the date purchased. If you call APC Customer Support, a technician will ask you to describe the problem and attempt to solve it over the phone. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
   - If the unit is under warranty, repairs are free.
   - Procedures for servicing or returning products may vary internationally. Refer to the APC Web site for country specific instructions.
3. Pack the unit in its original packaging. If this is not available:
   - Pack the unit carefully to avoid damage in transit. Never use Styrofoam beads for packaging.
   - Damage sustained in transit is not covered under warranty.
4. **Always DISCONNECT THE UPS BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) and IATA regulations.** The battery(s) may remain in the unit.
5. Mark the RMA# on the outside of the package.
6. Return the unit by insured, prepaid carrier to the address given to you by Customer Support.

Two-Year Warranty

The limited warranty provided by American Power Conversion (APC®) in this statement of Limited Factory Warranty applies only to products you purchase for your commercial or industrial use in the ordinary course of your business.

Terms of warranty

APC warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. The obligation of APC under this warranty is limited to repairing or replacing, at its sole discretion, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory-remanufactured.

Non-transferable warranty

This warranty extends only to the original purchaser who must have properly registered the product. The product may be registered at the APC Web site, www.apc.com.

Exclusions

APC shall not be liable under the warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by end user or any third person misuse, negligence, improper installation or testing. Further, APC shall not be liable under the warranty for unauthorized attempts to repair or modify wrong or inadequate electrical voltage or connection, inappropriate on-site operation conditions, corrosive atmosphere, repair, installation, start-up by non-APC designated personnel, a change in location or operating use, exposure to the elements, Acts of God, fire, theft, or installation contrary to APC recommendations or specifications or in any event if the APC serial number has been altered, defaced, or removed, or any other cause beyond the range of the intended use.

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NO SALESMAN, EMPLOYEE OR AGENT OF APC IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. WARRANTY TERMS MAY BE MODIFIED, IF AT ALL, ONLY IN WRITING SIGNED BY AN APC OFFICER AND LEGAL DEPARTMENT.

Warranty claims

Customers with warranty claims issues may access the APC customer support network through the Support page of the APC Web site, www.apc.com. Select your country from the country selection pull-down menu. Open the Support tab at the top of the Web page to obtain contact information for customer support in your region.

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Contact information

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Refer to the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
  - **www.apc.com** (Corporate Headquarters)
    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**
    Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  Local, country-specific centers:
  go to **www.apc.com/support/contact** for information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

Regulatory agency approvals and radio frequency warnings

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